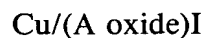


**Amendments to the Claims:**

*This listing of claims will replace all prior versions, and listings, of claims in the application:*

1. (Currently Amended) A platinum group metal-free (PGM-free) regenerable catalyst composition for entrapping  $\text{SO}_x$ , the composition comprising a component having formula I;



wherein A oxide is selected from the group consisting of  $\text{SiO}_2$ ,  $\text{Zr-SiO}_2$ ,  $\text{Al}_2\text{O}_3$ ,  $\text{TiO}_2\text{-Al}_2\text{O}_3$ ,  $\text{ZrO}_2$ ,  $\text{In}_2\text{O}_3$ , and mixtures thereof, wherein the platinum group metal-free regenerable catalyst has a Cu loading from about 10 mol % to about 60 mol %.

2. (Cancelled)

3. (Original) The platinum group metal-free regenerable catalyst of claim 1 wherein the Cu loading is about 25 mol %.

4. (Original) The platinum group metal-free regenerable catalyst composition of claim 1 wherein the A oxide is selected from the group consisting of  $\text{SiO}_2$ ,  $\text{Zr-SiO}_2$ ,  $\text{TiO}_2\text{-Al}_2\text{O}_3$ ,  $\text{ZrO}_2$ ,  $\text{In}_2\text{O}_3$ , and mixtures thereof.

5. (Original) The platinum group metal-free regenerable catalyst composition of claim 1 wherein the A oxide is selected from the group consisting of  $\text{SiO}_2$ ,  $\text{Zr-SiO}_2$ , and mixtures thereof.

6. (Original) The platinum group metal-free regenerable catalyst composition of claim 1 wherein the A oxide comprises  $\text{SiO}_2$ .

7. (Original) The platinum group metal-free regenerable catalyst composition of claim 1 wherein the A oxide comprises  $\text{Zr-SiO}_2$ .

8. (Currently Amended) A method of adsorbing  $\text{SO}_x$  as metal sulfate in a temperature range of  $200^\circ\text{C}$  to  $500^\circ\text{C}$  under lean fuel conditions, the method comprising contacting an exhaust with ~~using~~ the catalyst composition of claim 1.

9. (Currently Amended) A method of desorbing metal sulfates at a temperature range of  $250^\circ\text{C}$  to  $450^\circ\text{C}$  under rich fuel conditions, the method comprising contacting an exhaust with ~~using~~ the catalyst composition of claim 1.

10. (Currently Amended) A platinum group metal free catalyst composition for entrapping  $\text{SO}_x$ , the catalyst composition comprising an oxide selected from the group consisting of ~~praseodymia, zirconia-praseodymia and mixed manganese-yttria and mixtures thereof~~ zirconia-praseodymia, mixed manganese-yttria and mixtures thereof.

11. (Currently Amended) The catalyst composition of claim 10 further comprising praseodymia.

12. (Original) The catalyst composition of claim 10 comprising zirconia-praseodymia.

13. (Original) The catalyst composition of claim 10 comprising mixed manganese-yttria.

14. (Currently Amended) A method of adsorbing  $\text{SO}_x$  as metal sulfate in a temperature range of  $200^\circ\text{C}$  to  $500^\circ\text{C}$  under lean fuel conditions, the method comprising contacting an exhaust with ~~using~~ the catalyst composition of claim 10.

15. (Currently Amended) A method of desorbing metal sulfates at a temperature range of  $250^\circ\text{C}$  to  $450^\circ\text{C}$  under rich fuel conditions, the method comprising contacting an exhaust with ~~using~~ the catalyst composition of claim 10.

16. (Currently Amended) A vehicle exhaust system comprising:  
a nitrogen oxide trap; and  
a SO<sub>x</sub> adsorbing component located upstream of the nitrogen trap in the vehicle exhaust system, the SO<sub>x</sub> adsorbing material comprising a catalyst selected from the group consisting of:

a) a platinum group metal-free (PGM-free) regenerable catalyst composition for entrapping SO<sub>x</sub> comprising a component having formula I;



wherein A oxide is selected from the group consisting of SiO<sub>2</sub>, Zr-SiO<sub>2</sub>, Al<sub>2</sub>O<sub>3</sub>, TiO<sub>2</sub>-Al<sub>2</sub>O<sub>3</sub>, ZrO<sub>2</sub>, In<sub>2</sub>O<sub>3</sub>, and mixtures thereof, wherein the platinum group metal-free regenerable catalyst has a Cu loading from about 10 mol% to about 60 mol%; or

b) a platinum group metal free regenerable catalyst composition for entrapping SO<sub>x</sub> comprising an oxide selected from the group consisting of praseodymia, zirconia-praseodymia and mixed manganese-yttria and mixtures thereof.

17. (Original) The vehicle exhaust system of claim 16 wherein the SO<sub>x</sub> adsorbing material comprises a platinum group metal-free (PGM-free) regenerable catalyst composition for entrapping SO<sub>x</sub> comprising a component having formula I;



wherein A oxide is selected from the group consisting of SiO<sub>2</sub>, Zr-SiO<sub>2</sub>, Al<sub>2</sub>O<sub>3</sub>, TiO<sub>2</sub>-Al<sub>2</sub>O<sub>3</sub>, ZrO<sub>2</sub>, In<sub>2</sub>O<sub>3</sub>, and mixtures thereof;

18. (Original) The vehicle exhaust system of claim 17 wherein the A oxide is selected from the group consisting of SiO<sub>2</sub>, Zr-SiO<sub>2</sub>, TiO<sub>2</sub>-Al<sub>2</sub>O<sub>3</sub>, ZrO<sub>2</sub>, In<sub>2</sub>O<sub>3</sub>, and mixtures thereof.

19. (Original) The vehicle exhaust system of claim 17 wherein the A oxide is selected from the group consisting of SiO<sub>2</sub>, Zr-SiO<sub>2</sub>, and mixtures thereof.

20. (Original) The vehicle exhaust system of claim 16 wherein the SO<sub>x</sub> adsorbing material comprises an oxide selected from the group consisting of praseodymia, zirconia-praseodymia and mixed manganese-yttria, and mixtures thereof;

21. (Original) The vehicle exhaust system of claim 16 wherein the SO<sub>x</sub> adsorbing component is a diesel oxidation catalyst.

22. (Original) The vehicle exhaust system of claim 16 wherein the SO<sub>x</sub> adsorbing component is a catalyzed soot filter.